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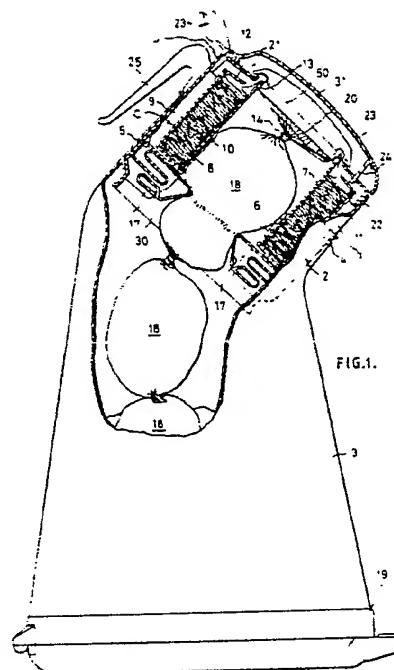
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54 **Device for using packs of flexible tubing in packaging.**

57 A series of packages (18) each containing a disposable object such as a baby's nappy is delivered from a unit U that maybe mounted with its axis in any portion between vertical and horizontal, for example on a bin (3). The objects are contained in a continuous length (10) of tubing withdrawn from a replaceable cassette (C) by closing the end of the tubing and thrusting it through a core (7) by inserting the objects by one and closing each package by twisting the tubing at (14) by turning the cassette with the integral core by a removable lid (31). A rotatable cutter in the lid is provided for severing the tubing above the top twist (14) when required.



**EP 0 356 051 A1**

## DEVICE FOR USING PACKS OF FLEXIBLE TUBING IN PACKAGING

This invention relates to a device for using packs of flexible tubing in packaging and in particular to packaging a series of objects respectively in individual packages along a length of such flexible tubing.

The invention is particularly applicable to the disposal of waste material although it is not exclusively applicable to that function. However, a main object of the invention is to provide for the ready disposal of babies' disposable nappies in a hygienic, convenient and economic way with the suppression or complete elimination of smell. An apparatus for this purpose has been described in European patent application No. 88301761.8 filed 1 March 1988.

According to the present invention, a device for packaging a series of objects respectively in individual packages distributed along a length of flexible, substantially non-resilient tubing providing the walls of the packages comprises means for supporting tubular guide means surrounded by a pack consisting of a profusely circumferentially layered or pleated length of the flexible tubing, the tubular guide means being open at both ends, and the supporting means being arranged for one end of the tubing to be drawn away from one end of the pack and then passed over the adjacent edge of the tubular guide means and thrust completely through the tubular guide means by an object to be packaged after the said end of the flexible tubing has been closed to form the base of the first package and means for manually turning the tubular guide means with the pack to twist the tubing beyond the object so as to close and thereby complete the package and so provide the base for a further package for a further object to be inserted within the tubular guide means.

Very advantageously the device when containing the tubular guide means and pack, may be constructed as a unit to be mounted in a raised position with the axis of the tubular guide means located at a selected angle between vertical and horizontal inclusive and for the packages to be subjected to gravity when free from the unit. This unit may, for example, be detachably secured to and supported by a bin. Alternatively the unit may be provided with means for supporting it with a flexible bag hanging therebeneath for collecting packages discharged from the unit.

Preferably the tubular guide means are incorporated in a replaceable cassette wherein a central core constitutes the tubular guide means, the core being surrounded by the pack, with a cylindrical casing surrounding the pack and fixed to the core beyond the end of the pack remote from that

from which the tubing is withdrawn, and a cap being mounted inside the casing and extending from the casing over the pack towards but not as far as the core.

The invention may be employed for various forms of waste, besides babies' disposable nappies. For example, the invention may be used in a hospital or for a dustbin. In this specification the items deposited in the packages will be referred to, except where otherwise indicated, as objects, whether they are single objects or discrete collections of items or even liquids.

In order that the invention may be clearly understood and readily carried into effect apparatus in accordance therewith will now be described, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a side elevation, mostly in section, of apparatus for packaging a series of objects respectively in individual packages distributed along a length of flexible tubing;

Figure 2 is a side elevation of the apparatus of Figure 1, showing two portions thereof separated from one another;

Figure 3, is a side elevation of a modification of the apparatus of Figures 1 and 2;

Figures 4 and 5 are side elevations showing ways of using the apparatus of Figure 3; and

Figure 6 is a plan, shown from beneath, of a detail of the apparatus of Figures 1 to 5.

Referring to Figures 1 and 2, a cylindrical plastics container 1 is arranged to be removably telescopically fitted into a mouth 2 set at an angle of 45° at the top of a plastics bin 3 and secured thereto by bayonet joints 4. The bin 3 has secured thereto an internal flange 5 from which a cylinder 6 extends upwards. A pack or cassette C comprising a tubular core 7, open at top and bottom, and joined at the bottom by an annulus 8 to a cylindrical casing 9 rests on the flange 5 and is rotatable on the cylinder 6. A profusely circumferentially layered or pleated length of flexible tubing 10 is located between the core 7 and casing 9. A cap 11 is mounted inside the upper end of the casing 9. This cap 11 has a flange 12 extending internally from the casing 9 but not as far as the core 7. The diameter of the core may be 4 inches (10.16 cm) and the diameter of the tubing 10 may be of 8.5 inches (21.6 cm). The length of the tubing may be 100 feet (30.48 m). However the device may be constructed in a wide variety of sizes.

To begin using the pack to form a series of packages of objects, which in this particular example will be considered to be a baby's disposable nappies, the top of the flexible tubing 10 is pulled

upwards and tied into a knot. This closed end can then form the bottom of a package to be formed along the length of part of the tubing. This is effected by pushing the closed end downwards inside the core 7 and cylindrical container 1 by the object to be packaged. As this is being done the flexible tubing 10 from the layered length slides over the top edge 13 of the core 7 which is made sufficiently smooth to prevent the flexible tubing (which may conveniently be high density polyethylene tubing) from being damaged.

When the object has been thrust well down into the concentric core 7 and cylindrical container 1, the package is closed by twisting the flexible tubing above the object as at 14. This is done by turning the cassette C about its axis. A lid 31 is formed for this purpose in that it has a depending annular flange 50 formed with an outer surface that is a taper fit in the top of the core 7. The package is prevented from turning about the axis of the core 7 during this manual twisting action by springs 17 fixed in the cylindrical container 1 and projecting radially inwards to engage the package. These springs are equidistantly spaced round the cylindrical container 1.

By the aforesaid means, a series of connected closed packages 18 are formed and this can be continued until the pleated tubing 10 is exhausted. In the arrangement of Figures 1 and 2 the packages collect in the bin 3 normally closed at the bottom by a hinged base 19 held by a catch which can be opened to enable the packages to be transported to a disposal facility after the topmost package has been severed from the remaining flexible tubing by means described below.

The aforesaid severing means is incorporated in the lid 31 which is a bipartite unit comprising an outer ring 55 formed with the flange 50 that locks into the top of the core 7 and disc 56 (Figure 6 which is an underneath plan) which is freely rotatable in the ring 55. The disc 56 comprises a circular transparent sheet 57, through which the user can see the twisted tubing, set in an angle section having a horizontal flange 58 located between narrow flanges inside the relatively stationary flange 50. Three finger pieces 60 are fixed inside this rig above the transparent sheet 57. A cutter unit 61 is fixed beneath the flange 58. This device has an upper arcuate part 62 and a lower tapered shoe 63 with a gap between them along the major portion of their length. Close to the closed termination of this gap a metal cutter blade is fixed as close as possible to the relatively stationary flange 50 so that the blade is shrouded against doing any damage to a person's fingers when the lid 31 is removed. The predominant material for the lid may be plastics material.

To operate the cutter unit 61, the disc 56 is

turned by means of the finger pieces 60 through a full revolution. In this movement the tapered shoe 63 pierces through the radially pleated taut portion 20 (Figure 1) of the flexible tubing that flares outward from the topmost twist 14 to the core 7. Further rotation of the disc 56 causes the cutter blade to cut round the tubing material, clearly separating the uppermost package from the flexible tubing remaining on the core 7.

A cover 21 made from plastics moulded material is secured to the top of the cylindrical container 1 by bayonet joints 22. A hinged see-through lid 23 forms part of the cover 21 and is held closed by a latch 24 arranged to be difficult for a toddler to operate and open the cover to start playing with the lid 31. When the flexible tubing has all been used, the lid 31 and cover 21 are removed for the replacement of the cassette C. The inclination at 45° of the assembly comprising the cylindrical container 1 and cassette enables this operation to be effected in inconvenient situation, for example when the apparatus is located under a kitchen work top. A further advantage of this inclined setting is that it enables a strong handle 25 to be permanently fixed to the cylindrical casing 1 and located thereby approximately over the centre of gravity of the entire apparatus shown in Figure 1. However, it is to be understood that other angles of inclination can prove useful and these can range from an upper limit which is nearly vertical to a lower limit which is horizontal.

Figure 2 shows the unit consisting of the cylindrical container 1, cover 21 and their contents just prior to mounting on the bin 3. This unit may be referred to as the "operative unit" U and it may be used in other situations while remaining fully operational. For example Figure 3 shows a wall bracket 26 on which the unit U is hung by way of its handle 25, the wall bracket being provided with a projection 27 for maintaining the unit vertical. In place of the bin 3 a flexible refuse bag 28 with an elasticated top 29 is hung beneath the unit. For this purpose the bottom edge of the container 1 is formed as a depending annular flange 30 with a concave cross-section to be gripped by the elasticated top 29.

The flexible refuse bag 28 is closed at the bottom by a flap 31 normally held closed by press studs 32. This makes it easy to dispose of the refuse by using the handle 25 to carry the assembly to a point where the press studs can be opened to deposit the packages as shown in Figure 4.

In a further alternative shown in Figure 5 the unit U and bag 28 are used without any prearranged support; for example on a tour or day out with the assembly being carried in the boot of a motor car.

The various objects described above as container, bin, core, casing, and bag need not always be impermeate but can be perforate or open work elements.

## Claims

1. A device for packaging a series of objects respectively in individual packages (18) distributed along a length of flexible, substantially non-resilient tubing (10) providing the walls of the packages, the device comprising means (5, 6) for supporting tubular guide means (7) surrounded by a pack consisting of a profusely circumferentially layered or pleated length of the flexible tubing, the tubular guide means being open at both ends, and the supporting means being arranged for one end of the tubing to be drawn away from one end of the pack and then passed over the adjacent edge of the tubular guide means (7) and thrust completely through the tubular guide means by an object to be packaged after the said end of the flexible tubing has been closed to form the base of the first package characterised in that means (31, 17) for manually turning the tubular guide means with the pack to twist (14) the tubing beyond the object so as to close and thereby complete the package and so provide the base for a further package for a further object to be inserted within the tubular guide means.

2. A device according to Claim 1, when containing said tubular guide means and pack, characterised in that the device is constructed as an operative unit U to be mounted in a raised position with the axis of the tubular guide means located at a selected angle between vertical and horizontal inclusive and for the packages to be subjected to gravity when free from the unit.

3. A device according to Claim 2, characterised in that it is in combination with bin 3 for receiving the packages from the unit, the unit being detachably secured to the bin.

4. A device according to Claim 2 characterised in that it is provided with means for supporting the unit with a flexible bag (28) hanging therebeneath for collecting packages discharged from the unit.

5. A device according to Claim 3 or Claim 4, characterised in that the bin or the bag is constructed so that it can be opened at the bottom for the discharge of packages collected therein.

6. A device according to any one of the preceding claims, characterised in that the supporting means include a rigid wall (1) surrounding the device and a handle (25) for carrying the device is fixed to the wall.

7. A device according to Claims 4 and 6, characterised in that the means for supporting the

unit comprise a bracket (26) for supporting the unit by way of the handle, the arrangement being for the handle to hook onto the bracket.

8. A device according to any one of the preceding claims, characterised in that the said tubular guide means (7) and pack are incorporated in a replaceable cassette (C) wherein a central core (7) constitutes the tubular guide means, the core being surrounded by the pack, a cylindrical casing (9) surrounds the pack and is fixed to the core beyond the end of the pack remote from that from which the tubing is to be withdrawn, and a cap (11) mounted inside the casing and extending from the casing over the pack towards but not as far as the core.

9. A device according to any one of the preceding claims, characterised in that the means for turning the tubular guide means with the pack to twist the tubing comprises a lid (31) formed to be detachably secured to the said edge of the tubular guide means over which the tubing is to pass and at least one element (17) mounted in said supporting means for inhibiting axial rotation of the portion of the tubing when containing the object.

10. A device according to Claim 9, characterised in that a cutter unit (61) is incorporated in the detachable lid and manually rotatable relatively thereto for severing the flexible tubing after it has been twisted to close a package thereby to detach that package or any series of individual packages of which it forms the end package.

11. A device according to Claim 10, characterised in that the cutter unit (61) comprises a two-armed member (62, 63) with one of the arms axially beyond the other, parallel or nearly parallel to the said edge of the tubular guide means, the arm (63) closer to the tubular guide means being shaped to pierce the material of the flexible tubing for a cutter fixed between the arms to cut the pierced tubing.

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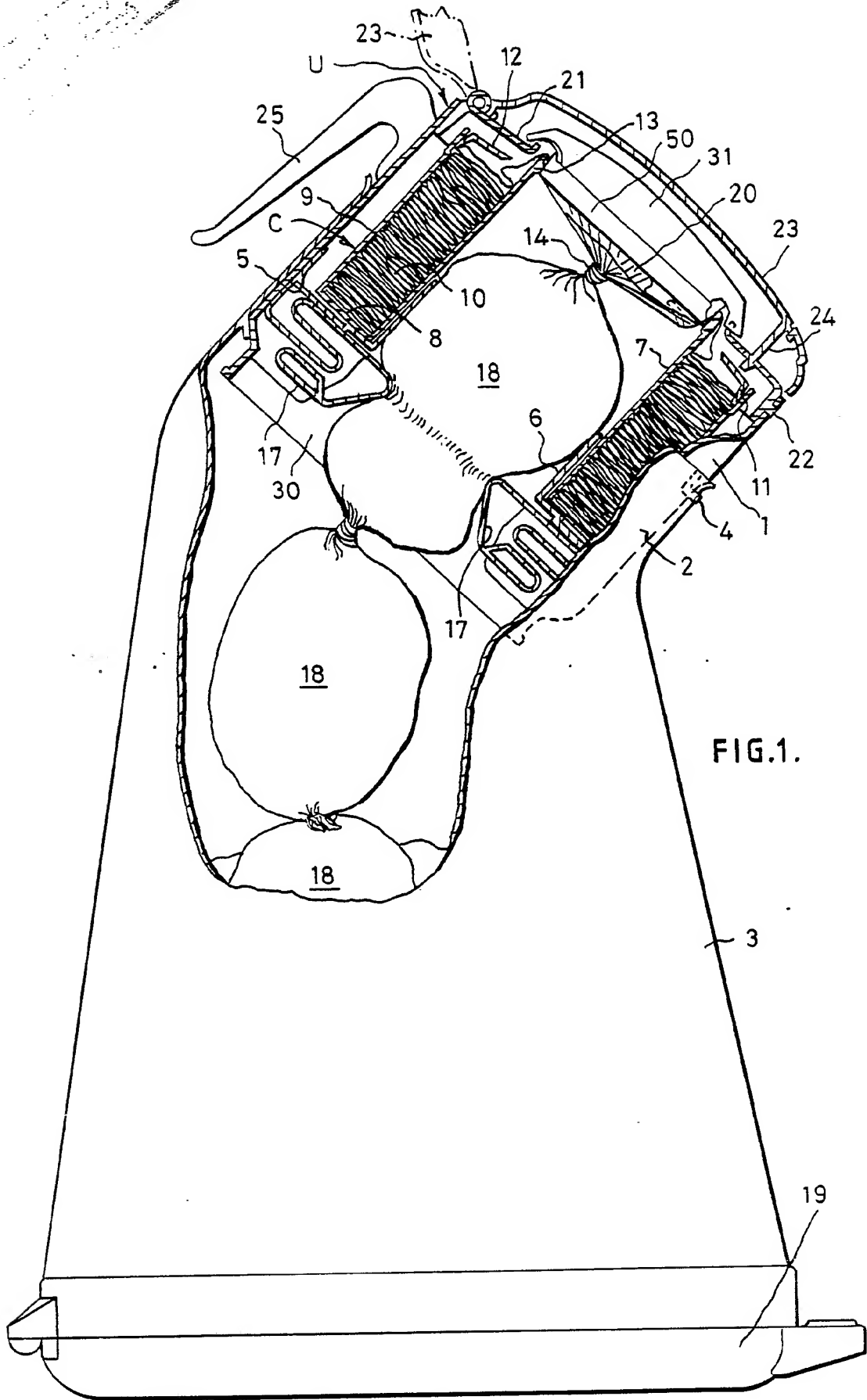
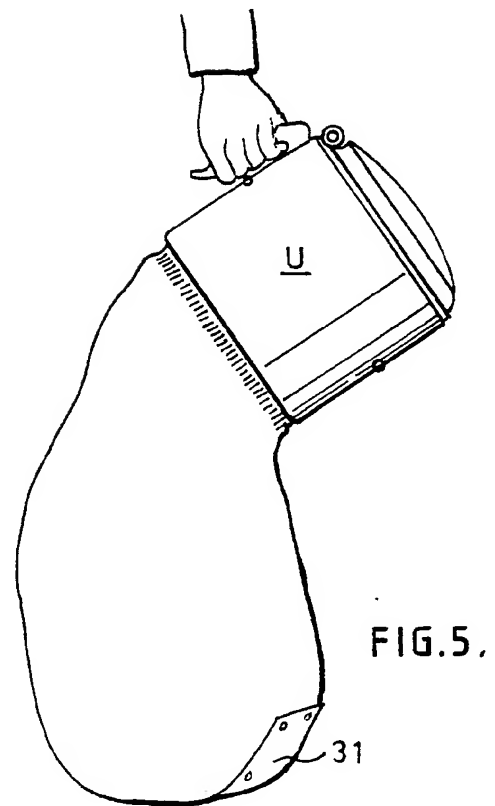
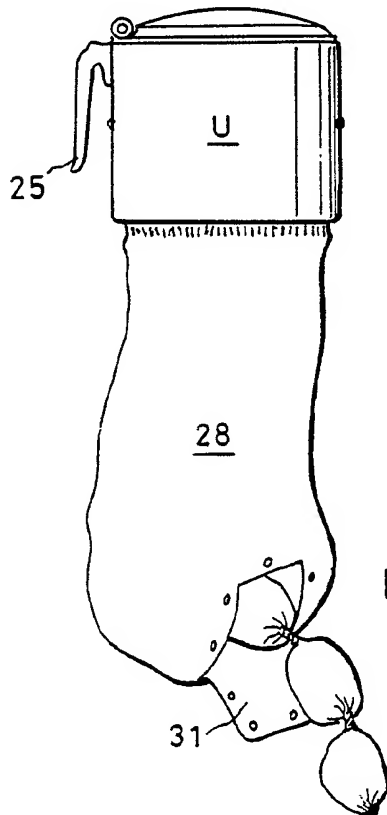
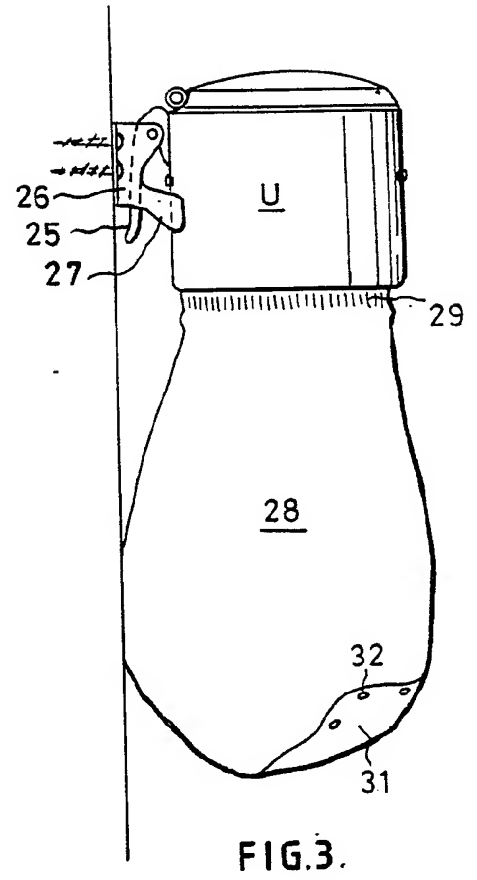
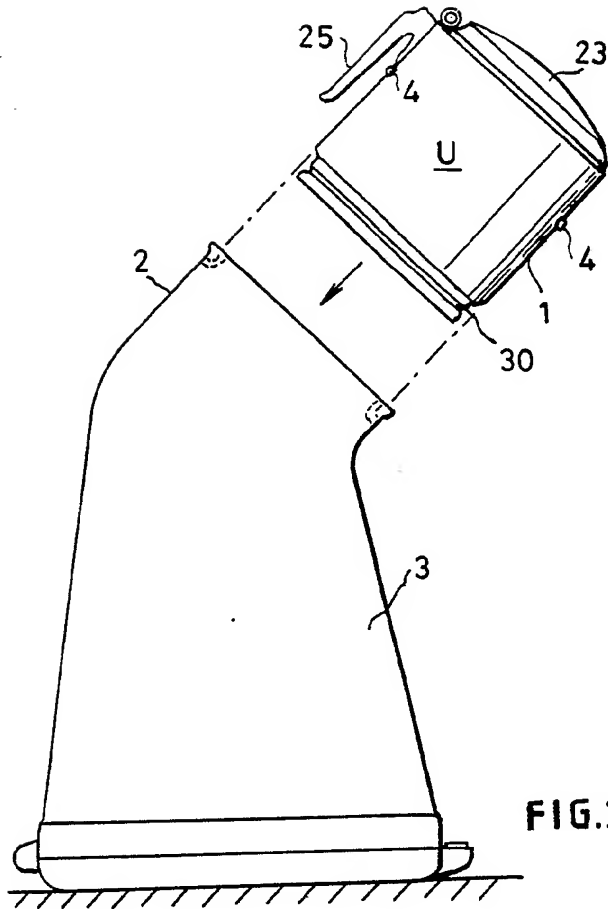


FIG.1.



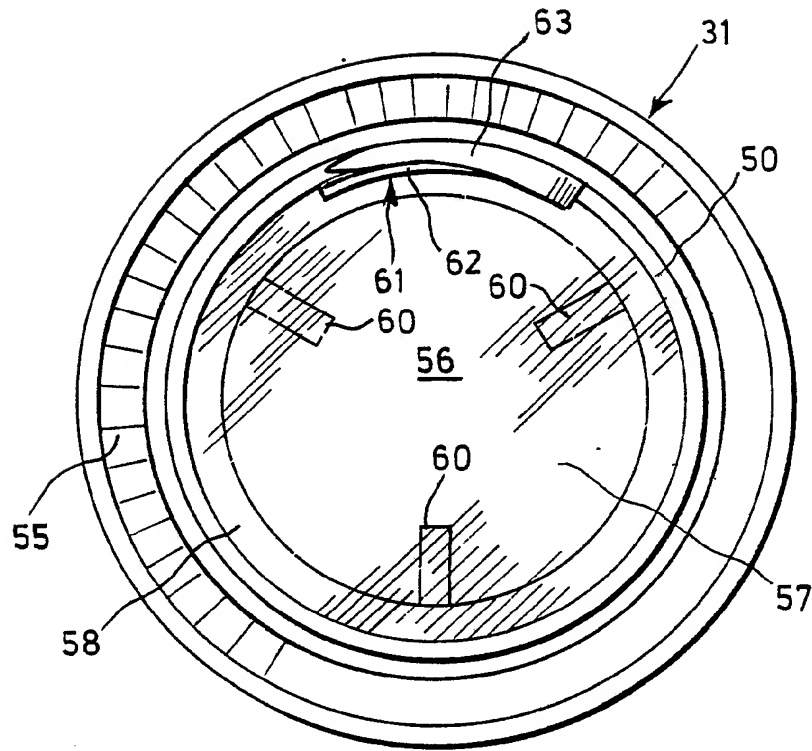


FIG.6.



DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X,P D	EP-A-0 281 355 (PROCESS IMPROVEMENTS LTD) * Whole document *	1,8,11	B 65 B 67/12 B 65 F 1/06
Y	GB-A-2 169 188 (WOO KYONG) * Whole document *	1	
Y	BE-A- 857 194 (SALKIN) * Whole document *	1	
A		9	
A	US-A-4 077 563 (LOEVQVIST) * Abstract; figure 3 *	2,3,5,6	
A	US-A-3 938 300 (LOEVQVIST) * Column 2, lines 3-8; column 5, lines 24-28; figures 1,5 *	7,8	
A	DE-A-2 239 880 (W. CORDES) * Page 7, paragraph 1; figure 1 *	10	
A	US-A-3 452 368 (J.R. COUPER)		TECHNICAL FIELDS SEARCHED (Int. Cl.5)
A	US-A-4 107 903 (WICKERSHEIM)		B 65 B B 65 F
A	GB-A-1 372 491 (MUCON ENGINEERING)		
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 15-09-1989	Examiner SCHELLE, J.
<b>CATEGORY OF CITED DOCUMENTS</b> X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ..... & : member of the same patent family, corresponding document			